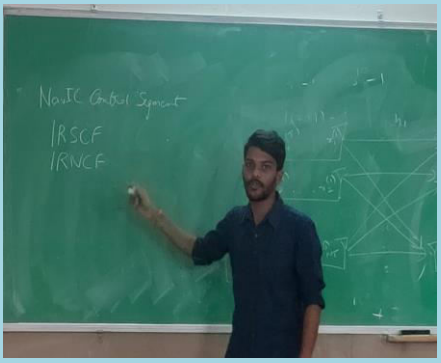
V R Siddhartha Engineering College (Autonomous): Vijayawada
Department of Electronics & Communication Engineering

ACTIVITY BASED LEARNING

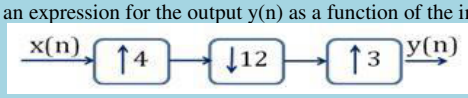
List of Faculty Members conducted Activity based teaching				
2021-22				
Name of the Faculty	**Subject**	**Activity**	**Topic**	**No.of students participated**
Dr. K. Shri Ramtej	Signals & Systems	Quiz using Mentimeter	Used to create interactive presentations & meetings, wherever you are using live polls, quizzes, Q&As and more to get real-time input regardless if you're remote, hybrid or face-to-face. Audience use their smartphones to connect to the presentation where they can answer questions. Visualize their responses in real-time to create a fun and interactive experience. https://drive.google.com/file/d/19s4-zgSPbNzGs1Kohl4diWhd9XAjrmRK/view?usp=sharing	72
Dr.GunnamSuryanaryana	Control Systems-20ES4102	Think Pair Share	Model using Signal Flow Graphs.	60
Y Sarada Devi	Analog and Digital communications	Think pair share	Think-pair-share (TPS) is a collaborative learning strategy where students work together to solve a problem or answer a question about an assigned reading. https://docs.google.com/document/d/1lvqB0lcymodOdp8rLdIXNPofVfw9APUnphnXkMUeamU/edit?usp=sharing	65
B Alekya	Global Navigation Satellite Systems	Think pair share	Applications of Remote Sensing with Bands used in Remote Sensing,Recordingof Energy by Sensor,Earth resources Satellites	138
G Hema kumar	Digital Signal Processing	Think Aloud Pair Problem Solving (TAPPS)	Cascading of Up sampler & Down sampler	62
Dr. B Lakshmi Sirisha	Analog and Digital image processing	Think Aloud Pair Problem Solving (TAPPS)	Solving problems on AM, FM, modulation index.	69
K V Ratna Praba	Control Systems-20ES4102	Think Aloud Pair Problem Solving (TAPPS)	RH Criterion, Root Locus, Block Diagram, Steady State Error	60
Dr. A Vijay Shankar	Aanlog communications	Concept mapping	Generation and detection methods of modulation	70

Description of Activity based teaching		
ACTIVE LEARNING	**THINK PAIR SHARE**	
Introduction	Collaborative learning is an instructional method in which student's team together on an assignment. In this method, students can produce the individual parts of a larger assignment individually and then "assemble" the final work together, as a team. Whether for a semester long project with several outcomes or a single question during class, collaborative learning can vary greatly in scope and objectives. Cooperative learning, sometimes confused with collaborative learning, describes a method where students work together in small groups on a structured activity. Students are individually accountable for their work but also for the work of the group as a whole, and both products are assessed.	
Name of the Faculty: GunnamSuryanaryana	Designation: Associate Professor	Subject :Control Systems-20ES4102
Year/Semester : II/I	Section : A	Topic:State Model using Signal Flow Graphs.
Name of the Activity: (Think Pair Share)	Date : 01-07-2022	No.of students attended : 60
Objective of the activity	**Objective of the activity:** • To understand the importance of modern control system theory over the conventional control systems theory. • To construct signal flow graph from the electrical, mechanical and rotational systems. • To build the state models using state space analysis and signal flow graphs. • To infer the relation of state equations with transfer functions and differential equations. To develop oral communication skills and fosters interpersonal relationships	
Execution Plan	**Execution Plan:** • The specified topic is assigned to the students. • The students are asked to analyze the topic for around 30 minutes approximately. • Next, the entire section is partitioned into 20 teams. Each team has 3 members. • Each student shares his/her ideas with their team members. • Finally each team shares their idea to the whole section. • Approximately 80-90% of the teams have completed the task successfully.	
Expected Outcomes	**Expected Outcomes:** **The students are able to** • Develop a state model from electrical, translational and rotational mechanical systems. • Able to find the response of multi-input multi-output systems • Understand the non-uniqueness of state models. • Find homogenous and non-homogenous solutions to state equations. • Build self-esteem and accept the academic challenges.	
Photos while conducting the activity		


Name of the Faculty : B. Alekhya, Sk. Khaleel Ahmed	Designation : Assistant Professor	Subject :Global Navigation Satellite Systems
Year/Semester :III/IV B.Tech, VI-Sem	Section : All sections	Topics :Applications of Remote Sensing with Bands used in Remote Sensing,Recordingof Energy by Sensor,Earth resources Satellites
Name of the Activity: (Think Pair Share)	Date : 26/05/2021	No.of students attended :138
Objective of the activity	To make students understand clearly the process and usage of Navigational systems and applications where satellites are involved. Students will get awareness about different GNSS signals and understand different systems that are usedfor navigation and finding object location	
Execution Plan	Group discussion and Seminars presented by students during classwork	
Expected Outcomes	Students are able to get internal as well as external view of GPS system, various signal generation techniquesand practical applications (like navigation, fining location of objecte.t.c)are understood by using GNSS systems.	
Photos while conducting the activity		

LEARNING ACTIVITY	**THINK ALOUD PAIR PROBLEM SOLVING (TAPPS)**
Introduction	Many educators today agree that students learn more in an active learning environment than they do in a passive learning environment. Active Learning is a process wherein students are actively engaged in building understanding of facts, ideas, and skills through the completion of instructor directed tasks and activities. It is any type of activity that gets students involved in the learning process. While strong conceptual understanding is important in solving analytical problems, it is also essential for the students to learn how to use their knowledge effectively in solving problems. Thinking aloud pair problem solving, which was first developed by Arthur Whimbey, aims to better understand thinking among the students. As the name suggests, this involves students working in pairs. One student (the problem solver) is required to read the problem aloud and think aloud during the problem solving process, which includes verbalizing everything they are thinking and doing. Another student (the listener) attends to the problem solver's thinking and reminds him/ her to keep

	saying aloud what he or she is thinking or doing, while also asking for clarifications and pointing out errors being made.	
Name of the Faculty : **G. Hema Kumar**	Designation : **Sr. Asst. Professor**	Subject : **Digital Signal Processing**
Year/Semester : **3rd year, Sem-II**	Section : **C**	Topic : **Cascading of Up sampler & Down sampler**
Name of the Activity: **(Think Pair Share)**	Date : **26-05-2022**	No. of students attended : **62/68**
Objective of the activity:	**To make students able to understand the concept of Multirate signal processing** **To obtain the frequency characterization of down sampler, up sample and sampling rate conversion by a factor I/D.** **To develop an expression for output y(n) of a multirate system as a function of input x(n).**	
Execution Plan :	**Time management: Class time: 50min** **1. Before conducting the activity conduct a surprise test, where students have to solve one question individually. Make a note of the marks - 10 mins.** **2. Class of sixty students is best suited for the activity. 15 batches are formed with 4 students each. It is suggested to have one good student in each batch with average and dull students based on the marks scored in the surprised test. Prepare minimum 4 different set of concept oriented analytical questions. – 20mins** **3. One student (the problem solver) is required to read the problem and think aloud during the problem solving process. The batch students (the listeners) attends to the problem solver's thinking and reminds him/her to keep saying aloud what he/she is thinking or doing, while also asking for clarifications and pointing out errors being made (if any).-10min** **4. For the next question the roles should be interchanged and the activity be performed. The questions can be rotated among the students. Altogether each student needs to solve two questions. -10min**	
Expected Outcomes:	**1. Students to have actively engaged in the learning process on Multirate signal processing concept.** **2. Students to learn and obtain the response of a system for up sampler and down sampler connected in cascading configuration.** **Students to obtain the frequency characterization of the sampling rate conversion by a factor D, I and I/D with necessary expressions**	
Assessment	**1. Total number of students attended = 62** **2. Total percentage of improvement = 90%** **3. No change of students before and after activity = 5%** **4. Negative change of students = 5%**	
Question paper	1. What is decimation and interpolation? Explain briefly with suitable sketches. 2. Explain the importance of anti-aliasing and anti-imaging filters. 3. With the help of block diagram explain the sampling rate conversion by a factor D with necessary expressions. **4.** With the help of block diagram, derive the expression for increasing the sampling rate by an integer factor of 'I'. **5.** Explain the sampling rate conversion by a factor I/D with neat diagram and obtain necessary equations. 6. Develop an expression for the output y(n) as a function of the input x(n) for the multirate structure shown in figure  . 7. A sequence x(n) starting at n=0 takes the values [0,5,4,3,1,2,5,0,5,4,3,1,2,5,0]. It is decimated by a factor of 3 and the resulting signal is interpolated by a factor of 2. Find the interpolated sequence. 8. Let x(n) = {1, 3, 2, 5, -1,-2, 2, 3, 2, 1}, find a. up sample by 2 times and down sample by 4 times b. down sample by 4 times and up sample by 2 times c. justify why these outputs are not equal 9. A signal is defined as x[n] = sin(πn). Draw the original, interpolated and decimated signals by a factor of 3. 10. Show that an up sampler and down sampler for linearity and time variance.	

while conducting the activity, activity photos,	 

Name of the Faculty : **Dr. B Lakshmi Sirisha**	Designation : **Associate Professor**	Subject : **Analog and Digital Communicatios**
Year/Semester : 3rd year, Sem-IV	Section : **C**	Topic : solving problems on AM, FM, modulation index.
Name of the Activity: (Think Aloud Pair Problem Solving)	Date :1.07.2022	No. of students attended : **69/72**

Objective of the activity:

1. To make students able to understand the concept of modulation.
2. To obtain modulation index and power calculation of AM, FM.
3. To design Frequency spectrum of AM, FM.

Execution Plan:

Time management: Class time: 50min

Before conducting the activity conduct a surprise test, where students have to solve one question individually. Make a note of the marks - 10 mins.

Class of sixty students is best suited for the activity. 15 batches are formed with 4 students each. It is suggested to have one good student in each batch with average and dull students based on the marks scored in the surprised test. Prepare minimum 4 different set of concept oriented analytical questions. – 20mins

One student (the problem solver) is required to read the problem and think aloud during the problem solving process. The batch students (the listeners) attends to the problem solver's thinking and reminds him/her to keep saying aloud what he/she is thinking or doing, while also asking for clarifications and pointing out errors being made (if any).-10min

For the next question the roles should be interchanged and the activity be performed. The questions can be rotated among the students. Altogether each student needs to solve two questions. -10min

Expected Outcomes:

1. Students to have actively engaged in the learning process on Modulation.
2. Students to learn and obtain the response of a modulation index and power calculation of AM, FM.
3. Students to obtain the frequency spectrum of AM, FM.

Assessment:

1. Total number of students attended = 69
2. Total percentage of improvement = 95%
3. No . change of students before and after activity = 5%
4. Negative change of students = 5%

Question paper

S.NO	PROBLEMS
1.	**The maximum peak-to-peak voltage of an AM wave is 16 mV and the minimum peak-to-peak voltage is 4 m modulation factor.**
2.	**A carrier of 100V and 1200 kHz is modulated by a 50 V, 1000 Hz sine wave signal. Find the modulation facto**
3.	**A sinusoidal carrier voltage of frequency 1 MHz and amplitude 100 volts is amplitude modulated by the sinu frequency 5 kHz producing 50% modulation. Calculate the frequency and amplitude of lower and upper side**
4.	**A carrier wave of frequency 10 MHz and peak value 10V is amplitude modulated by a 5- kHz sine wave of a Determine (i) modulation factor (ii) sideband frequencies and (iii) amplitude of sideband components. Draw spectrum.**
5.	**A carrier wave of 500 watts is subjected to 100% amplitude modulation. Determine : (i) power in sidebands (ii) power of the modulated wave.**
6.	**A 50 kW carrier is to be modulated to a level of (i) 80% (ii) 10%. What is the total sideband power in each ca**
7.	**A 40kW carrier is to be modulated to a level of 100%. (i) What is the carrier power after modulation?**

	(ii) How much audio power is required if the efficiency of the modulated RF amplifier is 72%?	
8.	An audio signal of 1 kHz is used to modulate a carrier of 500 kHz. Determine (i) sideband frequencies (ii) ba	
9.	The load current in the transmitting antenna of an unmodulated AM transmitter is 8A. What will be the ant when modulation is 40%?	
10.	A modulating signal m(t)=10cos(2π×103t)m(t)=10cos(2π×103t) is amplitude modulated w signal c(t)=50cos(2π×105t)c(t)=50cos(2π×105t). Find the modulation index, the carrier power, and the p transmitting AM wave.	

Activity photos

Name of the Faculty : P. Satyanarayana	Designation : **Assistant Professor**	Subject : **Pulse & Switching Circuits**
Year/Semester : 2nd year, Sem-II	Section : **D**	Topic : **Linear and Non Linear Waveshaping,**
Name of the Activity: (Think Pair Share)	Date : **10-06-2022**	No. of students attended : **65/70**

Objective of the activity:

1. **To make students able to understand the concept of Linear and Non Linear Wave Shaping.**
2. **To obtain the transfer characteristics of clippers and clamper circuits and to verify the response of various input signals for low pass and high pass RC circuits.**
3. **To Design and verify the response of Clippers, clampers, multivibrators and timebase generators..**

Execution Plan:

Time management: Class time: 50min

Before conducting the activity conduct a surprise test, where students have to solve one question individually. Make a note of the marks - 10 mins.

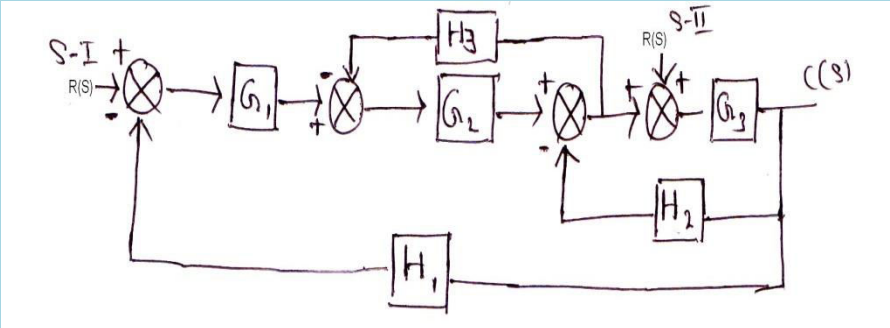
Class of sixty students is best suited for the activity. 15 batches are formed with 4 students each. It is suggested to have one good student in each batch with average and dull students based on the marks scored in the surprised test. Prepare minimum 4 different set of concept oriented analytical questions. – 20mins

One student (the problem solver) is required to read the problem and think aloud during the problem solving process. The batch students (the listeners) attends to the problem solver's thinking and reminds him/her to keep saying aloud what he/she is thinking or doing, while also asking for clarifications and pointing out errors being made (if any).-10min

For the next question the roles should be interchanged and the activity be performed. The questions can be rotated among

	the students. Altogether each student needs to solve two questions. -10min
Expected Outcomes:	**1. Students to have actively engaged in the learning process on Linear and Non Linear Wave Shaping.** **2. Students to learn and obtain the response of a Multivibrator circuits(Fixed bias binary, Self bias binary, Monostable and Astable multivibrators)** **3. Students to obtain the response and verified the response of voltage and current time base generators.**
Assessment:	**1. Total number of students attended = 70** **2. Total percentage of improvement = 85%** **3. No change of students before and after activity = 15%** **Negative change of students = 6%**
Question paper	
Activity photos	  

Name of the Faculty : **K.V.Ratna Prabha**	Designation: **Asst. Professor**	Subject : **Control Systems**
Year/Semester : **2nd year, Sem-II**	Section:C	Topic: **RH Criterion, Root Locus, Block Diagram, Steady State Error**
Name of the Activity: **(Think Aloud Pair Problem Solving (TAPPS))**	Date : **08-07-2022**	No.of students attended : **60**
Objective of the activity:	**1. To make students able to understand the concept of stability using RH Criterion, Root Locus** **2. To obtain the value of K from the Root Locus Graph and RH criterion.** **3. To obtain the transfer function from the Block Diagram.**	
Execution Plan:	**Time management: Class time: 50min** **1. Before conducting the activity conduct a surprise test, where students have to solve one question individually. Make a note of the marks - 10 mins.** **2. Class of sixty students is best suited for the activity. 10 batches are formed with 6 students each. It is suggested to have one good student in each batch with average and dull students based on the marks scored in the surprised test. Prepare minimum 10 different set of concept oriented analytical questions. – 20mins** **3. One student (the problem solver) is required to read the problem and think aloud**	

	during the problem solving process. The batch students (the listeners) attends to the problem solver's thinking and reminds him/her to keep saying aloud what he/she is thinking or doing, while also asking for clarifications and pointing out errors being made (if any).-10min **4. For the next question the roles should be interchanged and the activity be performed. The questions can be rotated among the students. Altogether each student needs to solve two questions. -10min**
Expected Outcomes:	**1.Students to have actively engaged in the learning process on stability concept.** **2.Students to learn and obtain the value of K from the Root Locus Graph and RH criterion.** **3. Students to learn and obtain the transfer function from block diagram**
Assessment:	**1. Total number of students attended = 60** **2. Total percentage of improvement = 98%** **3. No change of students before and after activity = 1%** **Negative change of students =NIL**
Question paper	1. Discuss the effect of adding poles and zeros to forward path transfer function on the root locus of closed loop system? 2. The characteristic equation of a feedback control system is $s^4+3s^3+12s^2+(k-16)s+k=0$ Sketch the root locus plot for $0\le k\le\infty$ and show that system is conditionally stable? 3. Sketch the root locus of the systems whose open loop transfer function is defined below and Comment on stability. Find the value of 'k' so that the damping ratio of closed loop System is 0.5. $G(s)=\frac{K}{S(S+2)(S^2+2S+2)}$ 4. Sketch the root locus of the systems $G(s)=\frac{K}{S(S+2)(S^2+2S+17)}$ 5. Comment on the stability of the system with characteristic equations. 1. $s^4+8s^3+18s^2+16s+5=0$ 6. Comment on the stability of the system with characteristic equations. $s^5+s^4+2s^3+2s^2+3s+5=0$ $s^6+2s^5+8s^4+12s^3+20s^2+16s+16=0$ 7. For a unity feedback system having forward path transfer function $G(s)=\frac{K}{s(1+0.6s)(1+0.4s)}$ Determine the range of values of K, marginal values of K and the frequency of sustained Oscillations. 8. Evaluate the closed loop transfer function when the input 'R' is at a) Station-I b) Station-II 

9. The unity gain feedback system is characterized by $G(S) = \frac{K}{S(S+10)}$ an open loop transfer function. Determine the gain 'K' so that the system will have a damping ratio of 0.5 for this value of 'K'. Determine the parameters settling time, peak time and peak overshoot.

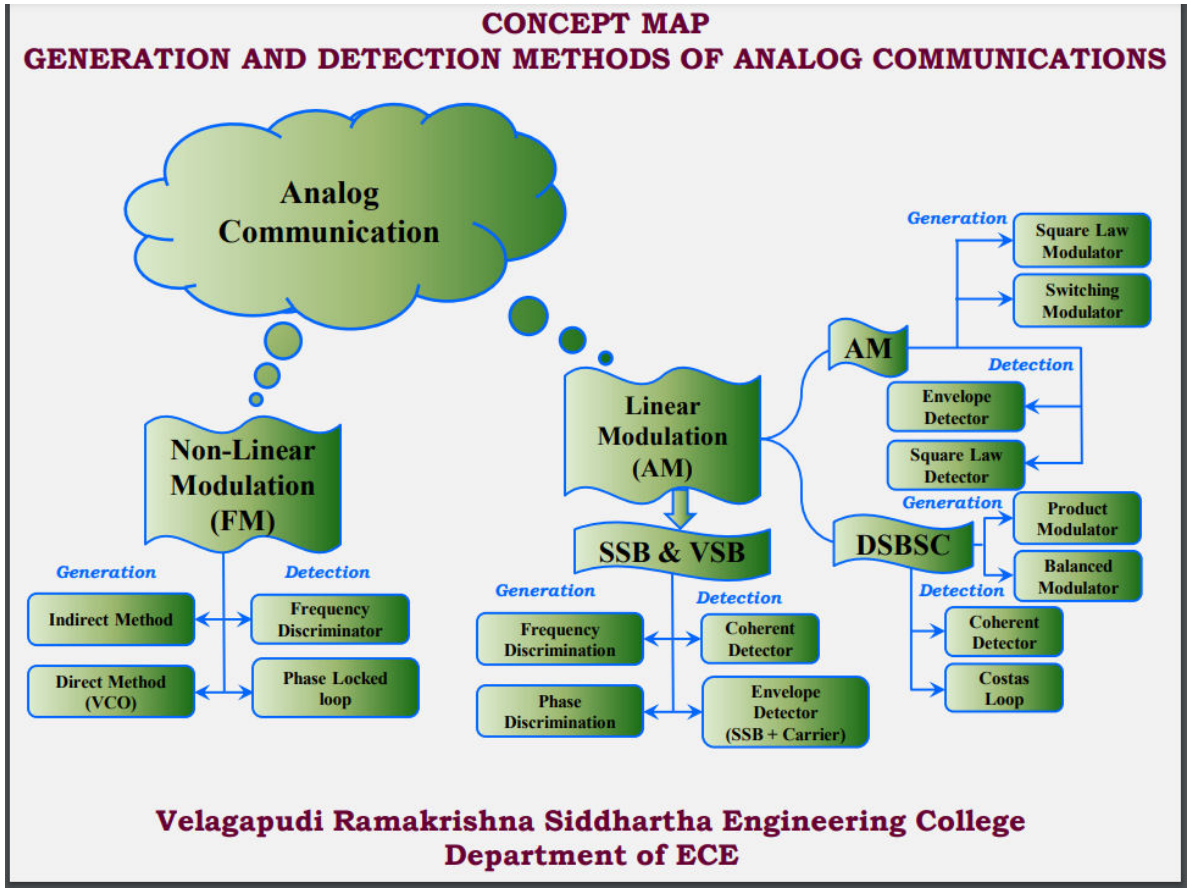
10. Find the steady state error of the system $G(S) = \frac{10}{S(0.1S+1)}$ when subjected to the inp

$$r(t) = a_0 + a_1 t + \frac{a_2 t^2}{2}$$

Activity photos

Figure: Mrs. K.V. Ratna Prabha has conducted Think Aloud Pair Problem Solving (TAPPS) activity

NAME OF THE ACTIVITY: CONCEPT MAPPING		
Name of the Faculty: Dr. A. Vijayasankar	Designation: Associate Professor	Subject: Analog Communications
Subject code: 17EC3404	Topic:Generation and Detection Methods of Analog Communications	No.of students attended: 125
Academic Year/Semester: 2020-21/ 4th semester	Class / Section: 2/4 ECE/ C & D	Date: 12.08.2021
Objective of the activity	Encourages higher-order thinking, empowering the students to transform information into knowledge by making meaningful connections between concepts or information.	
Execution Plan	Demonstrate and describe the students in the classroom	
Expected Outcomes	Visualize the relatioship among various modulation and demodulation techniques of analog communications	
Assessment	Internal and Semester End Examination	



List of Faculty Members conducted Activity based teaching

2020-21					
S.No	Name of the Faculty	Subject	Activity	Topic	No.of students participated
1.	G Kishore Kumar	Digital Circuit Design	Think Pair Share	NAND and NOR implementation	55
2.	B alekya	Remote Sensing and GIS 17EC4703/C	Think pair share	Applications of Remote Sensing with Bands used in Remote Sensing, Recording of Energy by Sensor, Earth resources Satellites	85
3.	Ch. Raghavendra	Electronic Measurements & Instrumentation	Think Pair Share	bridges	40
4.	Dr. p siva rama krishna	VLSI Design	Think Pair Share	MOD device scaling	34
5.	Dr.G.Surya narayana	Analog electronics	Think Pair Share	Q-point stabilization based on self bias	60
6.	K vara prasad	Microcontrollers	In class Teams	Addressing modes	60
7.	Dr. Venkata sainadh guptha	Mobile & cellular communications	In class Teams	Channels in GSM	42
8.	Dr. V Praveen naidu	Optical Communications	Flipped Classroom	Optical Fiber Sources, Detectors, Measurement Techniques	16
9.	Dr. K A Meerja	Ad-HOC and sensor networks	Group writing assignments	Open issues in vehicle communications	60
10.	V B K L Aruna	Computer architecture and organization	Flipped Classroom	Connection of I/O bus to input – output devices.	10
11.	G Hema kumar	Probability theory and random processes	Think aloud pair problem solving (TAPPS)	Mean and variance of random variables	56
12.	K V Ratna Prabha	Linear control systems	Think aloud pair problem solving (TAPPS)	RH criterion , root locus	64
2019-20					
13.	Dr. K sri ram teja	Principles of radar engineering	Concept mapping		72
14.	Dr. T V Sainadh Guptha	Computer networks	Interactive quize compititions using mentimeter	Programming concepts of 8051 using Assembly Language Programming and C Programming for parallel ports, Interrupts, Serial communication etc. https://drive.google.com/drive/folders/1M38BwIwndj5Trk2I9kAGO_q480843b-V	28
		Microcontrollers	Interactive quize compititions using mentimeter		25
	Dr. P.S.Suhasini	Data Compression - Problem on LBG Algorithm	Google Forms	https://docs.google.com/forms/d/1RUqX6fbqbeRRHWZqDgxTWaYDYHklh7BVyyPaOEcQfhM/edit	
15.	Dr. M Padmaja	Microcontrollers	Interactive quize compititions using online google forms	ARM Cortex M3 Memory mapping concepts https://drive.google.com/drive/u/1/folders/1iF7YOXan6	32

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16.	A Ravi Raja	17EC 4801/C Cryptography and Data Security	Google Class rooms	A quiz program is conducted in May 2020 for IV B. Tech section B & C 50 students participated. https://forms.gle/EBqSNMLTDahviswXA	25
17.			Theoretical classes through online platform	Theoretical concepts are taught through video interaction with students https://drive.google.com/file/d/1ju3jP8wt2T6Gi0QCzH-N0TKhTIxIUvtM/view?usp=sharing	26
18.	Dr Shaik Fayaz Ahamed	Microcontroller (8051) programming	i. Quiz Competition using Google Class rooms	A quiz program is conducted on 30th May 2020 for III B. Tech section B. 60 students participated. Blank Quiz - Google Forms	39
19.			ii. Programming concepts through demo programs	8051 programming concepts are taught through simulation programs. https://drive.google.com/file/d/1k1-WXUZxnXDs2pljDrvjaZQO46oKy5OS/view?usp=sharing https://drive.google.com/file/d/111EnTHLy6uT2XSKmS9mHwHJFXbQaJ8kD/view?usp=sharing	44

Description of Activity based teaching

ACTIVE LEARNING	**THINK PAIR SHARE**	
Introduction	Collaborative learning is an instructional method in which student's team together on an assignment. In this method, students can produce the individual parts of a larger assignment individually and then "assemble" the final work together, as a team. Whether for a semester long project with several outcomes or a single question during class, collaborative learning can vary greatly in scope and objectives. Cooperative learning, sometimes confused with collaborative learning, describes a method where students work together in small groups on a structured activity. Students are individually accountable for their work but also for the work of the group as a whole, and both products are assessed.	
Name of the Faculty: G Kishore Kumar	Designation: Assistant Professor	Subject: Digital Circuit Design
Year/Semester : II/I	Section : D	Topic : NAND and NOR implementation
Name of the Activity: (Think Pair Share)	Date : 30/11/2021	No.of students attended : 55
Objective of the activity	Design minimized combinational logic circuits using Karnaugh Maps or truth table representations. Implement combinational circuits using simple gates, complex gates, steering logic, programmable logic, or universal gates.	
Execution Plan	A significant amount of work has been done to prove the effectiveness and promote the use of active learning techniques, as opposed to the traditional lecture-based teaching. In our version of the class, we adopted the famous Think, Pair, Share (TPS) active learning approach. Design Project (DP) – Think component. Each student is to work individually on an assigned project. Laboratory Project(LP) - Pair component. Students are asked to team up in groups of two. Laboratory Report - Share component. In this step, each student writes an individual report explaining the design and sharing the results of the project. Module # 1 DP: In this DP, students are asked to use their newly acquired knowledge of universal gate sets to design a half adder using only one type of gates, typically two-input NOR or two-input NAND. LP: In this LP, students are asked to implement the half adder developed in the DP using small scale integration (SSI) circuits. The main goal when using SSI circuits is to create a design that uses the minimum number of Integrated Circuits (ICs).	
Expected Outcomes	By using the above strategy, 1. Learners not only learn the concept but also provides the scope to analyze the concept. 2. Moulds the student share their ideas with other learners which in turn also increases the communication skills. 3. When I implement this technique in my class learners showing much interest to participate and share their knowledge, which helps to analyze the level of understand the concepts by the learners.	

Photos while conducting the activity	 

Name of the Faculty : B. Alekhya	Designation : Assistant Professor	Subject : Remote Sensing and GIS 17EC4703/C
Year/Semester : IV/IV B. Tech, VII-Sem	Section : All sections	Topics : Applications of Remote Sensing with Bands used in Remote Sensing, Recording of Energy by Sensor, Earth resources Satellites
Name of the Activity: (Think Pair Share)	Date : 29/11/2021	No. of students attended : 85
Objective of the activity	To make students understand clearly the process and usage of remote sensors and applications where satellites are involved. Students will get awareness about different bands used in remote sensing as well as their importance	
Execution Plan	Group discussion and Seminars presented by students during classwork	
Expected Outcomes	Students are able to get internal as well as external view of earth satellites, Various benefits and practical applications (like crop yield, environmental impact, forest applications, snow detection e.t.c) are understood by using remote ensing	
Photos while conducting the activity	 	

Name of the Faculty: Dr. A. Vijayasankar	Designation: Associate Professor	Subject: Antennas and wave Propagation
Year/Semester: IV/I	Section: A	Topic: Radiation Patterns of Thin Linear Antennas
Name of the Activity: (Think Pair Share)	Date: 25/10/2021	No. of students Attended: 48
Objective of the Activity:	Students have to derive the field intensity expression of thin linear antenna of any size. Analyse the field distribution at various points of spherical coordinate system. Plot the radiation pattern of linear antennas of different lengths based on field intensity.	
Execution Plan:	***Think Phase*** ***[Duration -10 Minutes]*** Question: Derive field intensity and plot the field intensity patterns of various thin linear antennas Students would individually brain storm - generate ideas – list out the potential functions involved in field derivation. Deliverable from this Phase: Generate ideas ***Pair Phase*** ***[Duration -30 minutes]*** Question: Pair up and execute the plan of action Students gets paired up, generate more ideas and execute their plan of action Deliverable from this Phase: Implement their ideas and analyse and plot the field quantities in spatial coordinates ***Share Phase -***	

	[Duration -20 minutes] Question: Share answer with classmates and also knows about various ideas. Students would share their results obtained with the class Deliverable from this Phase: Share the answers to their classmates and correct themselves.
Expected Outcomes	By using the above strategy, Learners not only learn the concepts but also provides the scope to analyse the concepts. Moulds the students to share their ideas with other learners which in turn also increases the level of understanding and communication skills.

Name of the Faculty : Mr.Ch.Raghavendra	Designation : Assistant Professor	Subject : Electronic Measurements & Instrumentation
Year/Semester :III/IV, I SEM	Section :A	Topic : Bridges
Name of the Activity: (Think Pair Share)	Date :10-11-2021	No.of students attended :40
Objective of the activity	To Design a bridge circuit and find out the unknown passive components	
Execution Plan	All the students in the class are divided as groups and each group consists of one advanced learner and 3 slow learners. One design problem is assigned to the each group, advanced learners will guide the slow learners while solving the design.	
Expected Outcomes	All the students are attained to required level of knowledge.	
Photos while conducting the activity	  	

Faculty : Dr. Siva Ramakrishna P	Designation : Asst. Professor	Subject : VLSI Design
Year/Semester : III/I	Section : A	Topic : MOS device scaling
Name of the Activity: (Think Pair Share)	Date : 27-11-2021	No. of students attended : 34
Objective of the activity	To identify various device parameters and apply scaling methods. To understand need for scaling/advantages . To make students understand VLSI technology process node improvements. To develop oral communication skills, Fosters and develops interpersonal relationships.	
Execution Plan	Given higher-level questions about the topic to the students Gave some time for thinking the answer for questions Now formed teams of team size 2 Gave some time to share the ideas themselves They shared their ideas to whole class Finally 85% of the groups have completed the task successfully	
Expected Outcomes	The students can be able to Understand how technology nodes are shrinking Analyze the different types of technology nodes Develops higher level thinking skills. Builds self esteem in students	

Photos while conducting the activity

LEARNING ACTIVITY

IN CLASS TEAMS

Introduction:

Active learning is anything course-related that all students in a class session are required to do, other than simply watching, listening and taking notes. Active Learning shifts focus from what the instructor should deliver to what the students should be able to do. Compared to students taught traditionally, students taught in a manner that incorporates small-group learning achieve higher grades, learn at a deeper level, retain information longer, are less likely to drop out of school, acquire greater communication and teamwork skills, and gain a better understanding of the environment in which they will be working as professionals

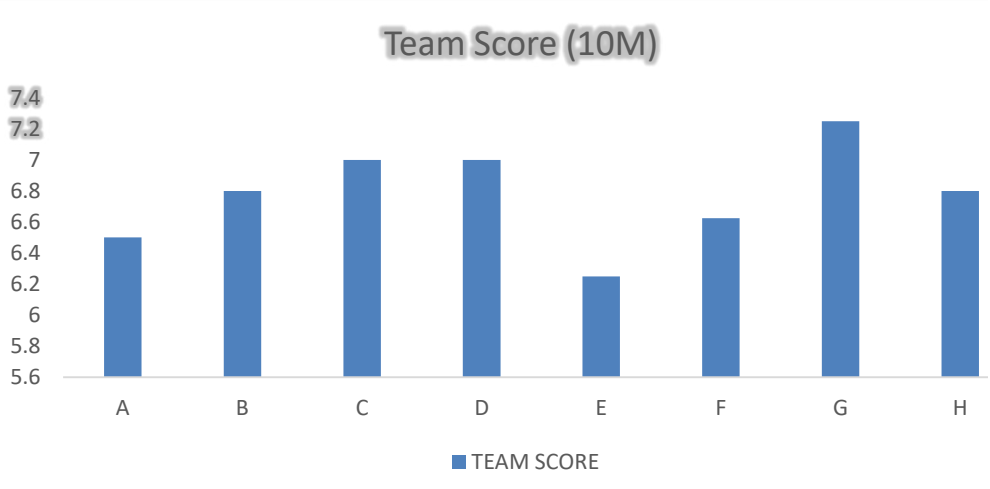
Name of the Faculty : K V PRASAD	Designation: Assistant Professor / Subject: Microcontrollers
Year/Semester :	Section: D / Topic: Addressing Modes
Name of the Activity: In Class Teams	Date: 30/12/2021 / No. of students attended : 60
Objective of the activity	This activity can enhance the remember cognitive skill of the students participated in the event.
Execution Plan	Technical content delivered via offline before this event and asked students to come to class prepared to actively apply this knowledge to answer the quiz questions. Time management: Students are divided into groups and each group consists of 8 students and each team is given 1 minute for the answer. The total time duration of the event is 50min.
Expected Outcomes	Students are expected to apply concepts for writing various assembly language programs using the instructions and understand the concepts of registers in 8051 microcontrollers.

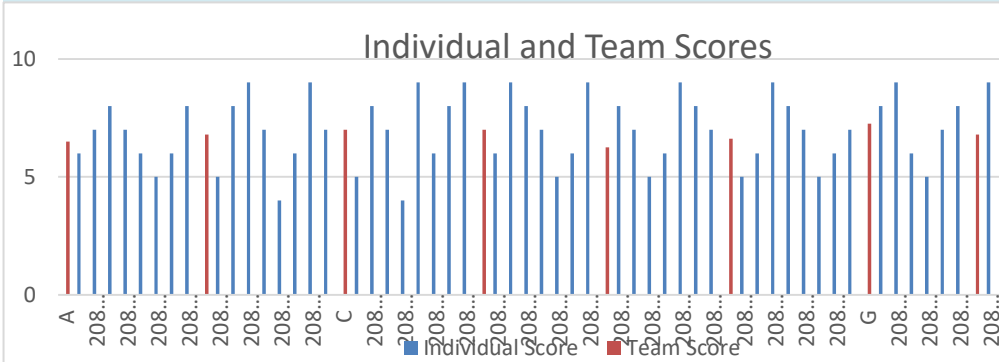
Analysis Report

S.No	Roll No	Team	Score individual(10M)	Team Score(10M)	Improvement/No Change
1.	208W1A04K9	A	6	6.5	Improvement
2.	208W1A04M5		7		No Change
3.	208W1A04P4		8		Improvement
4.	208W1A04M9		7		No Change
5.	208W1A04K5		6		Improvement
6.	208W1A04J2		5		No Change
7.	208W1A04M4		6		No Change
8.	208W1A04N7		8		Improvement
9.	208W1A04L9	B	5	6.8	No Change
10.	208W1A04M2		8		Improvement
11.	208W1A04P2		9		Improvement
12.	208W1A04J9		7		Improvement
13.	208W1A04K7		4		No Change
14.	208W1A04J5		6		Improvement
15.	208W1A04M6		9		Improvement
16.	208W1A04L7		7		Improvement
17.	208W1A04L5	C	5	7	No Change
18.	208W1A04P3		8		Improvement
19.	208W1A04P5		7		Improvement
20.	208W1A04P6		4		No Change
21.	208W1A04L0		9		Improvement
22.	208W1A04N3		6		No Change

23.	208W1A04L4		8		Improvement
24.	208W1A04M7		9		Improvement
25.	208W1A04N8	D	6		Improvement
26.	208W1A04O9		9		Improvement
27.	208W1A04O5		8		Improvement
28.	208W1A04N5		7	7	No Change
29.	208W1A04K6		5		No Change
30.	208W1A04J8		6		Improvement
31.	208W1A04P0		9		No Change
32.	208W1A04O6	E	8		Improvement
33.	208W1A04O4		7		Improvement
34.	208W1A04K3		5		Improvement
35.	208W1A04K4		6	6.25	Improvement
36.	208W1A04N1		9		Improvement
37.	208W1A04L1		8		Improvement
38.	208W1A04M8		7		Improvement
39.	208W1A04N2	F	5		No Change
40.	208W1A04J6		6		Improvement
41.	208W1A04M0		9		Improvement
42.	208W1A04M1		8		Improvement
43.	208W1A04N6		7	6.625	Improvement
44.	208W1A04P1		5		No Change
45.	208W1A04O0		6		Improvement
46.	208W1A04J3		7		No Change
47.	208W1A04N9	G	8		No Change
48.	208W1A04O1		9		No Change
49.	208W1A04N0		6	7.25	Improvement
50.	208W1A04N4		5		No Change
51.	208W1A04O2		7		Improvement
52.	208W1A04O3		8		No Change
53.	208W1A04L8	H	9		No Change
54.	208W1A04K8		6		Improvement
55.	208W1A04J4		5		No Change
56.	208W1A04O8		5	6.8	No Change
57.	208W1A04O7		6		Improvement
58.	208W1A04L3		9		Improvement
59.	208W1A04K2		8		No Change
60.	208W1A04J7		7		No Change

Analysis Graphs





Activity Photos

Introduction

Instructional environments that allow for students to be more actively engaged with course material are more likely to lead to greater learning gains. The literature in engineering and science education continues to encourage faculty and instructors to use class exercises that require students to be actively engaged in the course material, as opposed to being passive recipients of information. Engineering students benefit from an active and interactive classroom environment where they can be guided through the problem solving process. Typically faculty members spend class time presenting the technical content required to solve problems, leaving students to apply this knowledge and problem solve on their own at home. There has recently been a surge of the flipped, or inverted, classroom where the technical content is delivered via online videos before class. Students then come to class prepared to actively apply this knowledge to solve problems or do other activities. In this paper, recommendations are made for applying this educational technique to large engineering classrooms.

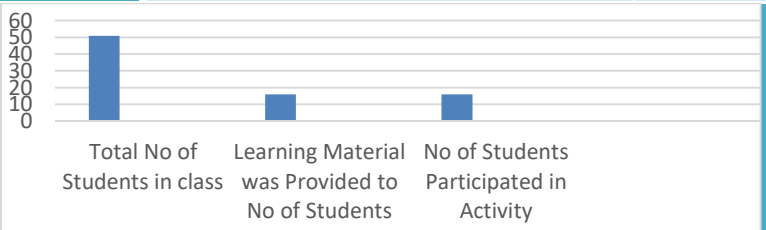
Name of the Faculty: Dr Praveen Naidu Vummadisetty	Designation: Associate Professor	Subject: Optical Communications 17EC4702/B
Year/Semester: 4-1	Section: A, B, C, D	Topic: Optical Fiber Sources, Detectors, Measurement Techniques
Name of the Activity: (Flipped Classroom)	Date: 27-11-2021	No. of students attended: 16

Objective of the activity	To make students understand clearly the process and usage of various optical fibers, optical sources and detectors and its applications. Students will get awareness about preparation of optical Fibers and also will able to calculate various Losses in the fibers.
Execution Plan	Technical content delivered via online videos before class and asked students to come to class prepared to actively apply this knowledge to solve problems. Time management: Students are divided into groups based on their preference and for each student batch 40 minutes time is given.
Expected Outcomes	Students are expected to apply concepts for finding various optical losses in the fibers, response time, quantum efficiency, delay time of the sources and detectors.
Videos link of activity	https://drive.google.com/file/d/1QRLoPlPZI1dOOQgaweel2UHTYFSR4cii/view?usp=sharing Learning Material to students: : https://drive.google.com/file/d/1QRLoPlPZI1dOOQgaweel2UHTYFSR4cii/view?usp=sharing

Activity assessment report

S.No	RollNo	Score before the activity(10M)	Score after the activity(10M)	Percentage
1.	198W5A0402	8	8	100
2.	198W5A0404	7	8	114
3.	198W5A0407	6	8	133
4.	198W5A0408	7	8	114
5.	198W5A0414	8	8	100
6.	198W5A0416	8	8	100
7.	198W5A0420	5	7	140
8.	198W5A0422	4	8	200
9.	198W5A0432	6	6	100
10.	188W1A0476	8	7	88
11.	188W1A04Ho	7	8	114
12.	188W1A04H4	6	8	133
13.	188W1A04H2	7	8	114
14.	188W1A04G4	8	8	100
15.	188W1A04G8	5	7	140
16.	188W1A04G2	4	8	200

Total No of Students in class : 16	Learning Material was Provided to No of Students :16	No of students participated in activity :16, Total Percentage of students participated in activity : 100%



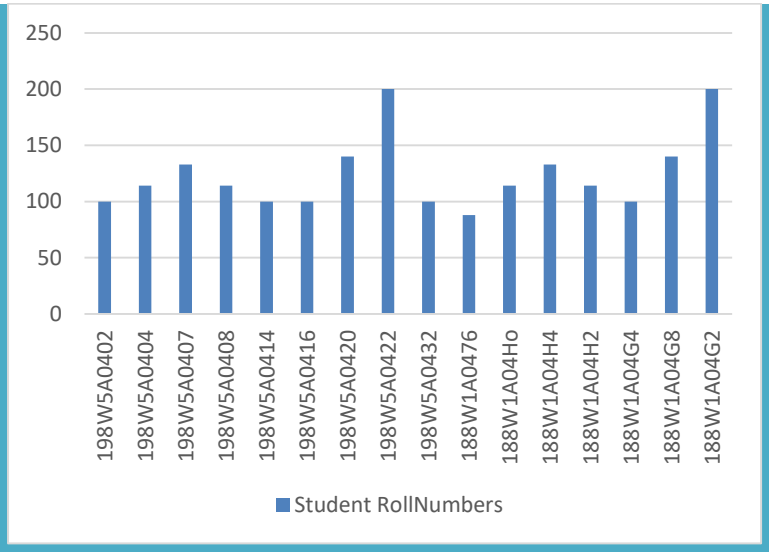


Fig: student performance graph

Name of the Faculty: Dr. KAM	Designation: Professor	Subject: 17EC4702/D
Year/Semester : 2021-22 (odd sem)	Section: B	Topic: open issues in
Name of the Activity (Flipped Classroom)	Date: 28/10/2021	No.of students attended: 60
Objective of the activity	To ensure deep understanding among students about the essential design issues that are required in designing wireless networks for future. As this is a broad topic, students are encouraged to share what are the most important and relevant issues that need to be tackled in modern day networks given the proliferation of IOT systems around us to lead us to build smart cities.	
Execution Plan	They were asked to download IEEE papers and discuss with the instructor to finalize the paper they would work on in parallel to their learning their fundamental concepts in classroom. An hour is allotted per week for a duration of two months for the students to study the paper in the presence of the instructor and discuss the technical content. Once they have understood the paper, they were asked to submit a report as part of home assignment. The students will actively discuss in the classroom the technical content with instructor and other colleagues to advance their technical understanding. Time management: Typically, an hour per week for two months was allocated for the students to carry out this activity.	
Expected Outcomes	An in depth technical report submitted for their home assignment	
Enclosures	Selected home assignments submitted by the students are enclosed	

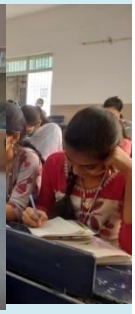
Name of the Faculty : Dr Venkata Sainath Gupta T	Designation : Assistant Professor	Subject : Mobile & Cellular Communications
Year/Semester : IV/I	Section : C & D	Topic : Channels in GSM
Name of the Activity: (In class Teams)	Date : 17-11-2021	No.of students attended : 42
Objective of the activity	Students will have an opportunity to discuss various logical channels of GSM in a team effectively. To understand the basic functionalities of Traffic and Control channels of GSM.	
Execution Plan :	▪ Creating the Teams with the size of 5-6 students and heterogeneous groups of students ▪ The distribution or announcement of Questions to each team-A, B, C, D ▪ After giving questions, student will be brainstorming the concept. ▪ Peer evaluation will be done among the team and give the remarks. ▪ Faculty role is to summarize the activity, observe and eliminate any misconceptions. Time management: Time: 50 Min a. Summarize the concepts 15min b. Creating team with 5-6 size 05 min. c. Distribution or announcement of Questions 05min. d. Student brainstorms and discuss by team 15min. e. Students should answer the final question 10min	
Expected Outcomes	Students can express their views and share knowledge 2. It's an interactive session and team work 3. Students can gain more knowledge	
Assessment	Assessment is carried out by peer evaluation. 2. 75% of the groups have completed the task successfully, the activity can be considered as successful.	

Enclosures	Photos while conducting the activity, analysis report
LEARNING ACTIVITY	**THINK ALOUD PAIR PROBLEM SOLVING (TAPPS)**
Introduction	Many educators today agree that students learn more in an active learning environment than they do in a passive learning environment. Active Learning is a process wherein students are actively engaged in building understanding of facts, ideas, and skills through the completion of instructor directed tasks and activities. It is any type of activity that gets students involved in the learning process. While strong conceptual understanding is important in solving analytical problems, it is also essential for the students to learn how to use their knowledge effectively in solving problems. Thinking aloud pair problem solving, which was first developed by Arthur Whimbey, aims to better understand thinking among the students. As the name suggests, this involves students working in pairs. One student (the problem solver) is required to read the problem aloud and think aloud during the problem solving process, which includes verbalizing everything they are thinking and doing. Another student (the listener) attends to the problem solver's thinking and reminds him/ her to keep saying aloud what he or she is thinking or doing, while also asking for clarifications and pointing out errors being made.
Faculty : G. Hema Kumar	Designation : Sr. Asst. Professor / Subject : Probability Theory & Random Processes
Year/Semester : 2nd year, Sem-I	Section : B / Topic : Mean and Variance of Random variable
Name of the Activity: (TAPPS)	Date :01-12-2021 / No. of students attended : 56
Objective of the activity:	• To make students able to understand the concept of Random variable • To obtain the probability density function of the random variable X • To determine the mean, Variance and Standard deviation of the random variable.
Execution Plan :	Time management: Class time: 50min • Before conducting the activity conduct a surprise test, where students have to solve one question individually. Make a note of the marks - 10 mins. • Class of sixty students is best suited for the activity. 15 batches are formed with 4 students each. It is suggested to have one good student in each batch with average and dull students based on the marks scored in the surprised test. Prepare minimum 4 different set of concept oriented analytical questions. – 20mins • One student (the problem solver) is required to read the problem and think aloud during the problem solving process. The batch students (the listeners) attends to the problem solver's thinking and reminds him/her to keep saying aloud what he/she is thinking or doing, while also asking for clarifications and pointing out errors being made (if any).-10min • For the next question the roles should be interchanged and the activity be performed. The questions can be rotated among the students. Altogether each student needs to solve two questions. -10min
Expected Outcomes:	• Students to have actively engaged in the learning process on Random variables concept. • Students to learn and obtain the probability density function of the identified random variable • Students to determine the moments about the origin and mean of the given random variable.
Assessment	• Total number of students attended = 56 • Total percentage of improvement = 93% • No change of students before and after activity = 5% • Negative change of students = 5%
Question paper	• Find the mean and variance of X for a uniform probability density function • Define and explain the following density and distribution functions with relevant plots. • (i) Gaussian, (ii) Rayleigh (iii) Exponential, (iv) Normal and (v) Uniform. • Find the mean and variance of X for a exponential probability density function • Determine the mean, variance and standard deviation of random variable X has pdf given by $f_x(x)=\begin{cases}2e^{-2x} & ;\ x\geq 0\\ 0 & ;\ x<0\end{cases}$ • If a random variable X is uniform distributed over (-a, 3a). Find the variance of X. • A random variable X has the density function $f_x(x)=\begin{cases}k\left(x^2-5x+8\right) & ;\ 0\leq x\leq 4\\ 0 & ;\ otherwise\end{cases}$. Find the moment's m_0, m_1, m_2 and m_4. • Determine the mean, variance and standard deviation for a Rayleigh random variable

$$f_x(x)=\begin{cases}\frac{2}{b}xe^{-x^2/b} & ;\ x\geq 0\\ 0 & ;\ x<0\end{cases}$$

- For a binomial distribution mean is 16 and standard deviation is √2. Find the first two terms of the distribution.
- The first four moments of a distribution about x=4 are 1, 4, 10 and 45 respectively. Show that the mean is 5, variance is 3, μ3=0 and μ4=26.
- Determine the skewness coefficient for the exponential density function $f_x(x)=\begin{cases}\frac{1}{b}e^{-(x/b)} & ;\ x\geq 0\\ 0 & ;\ x<0\end{cases}$

while conducting the activity, activity photos,



Name of the Faculty :K.V. Ratna Prabha	Designation: Asst. Professor	Subject : Linear Control Systems
Year/Semester : 3rd year, Sem-I	Section: A	Topic: RH Criterion, Root Locus
Name of the Activity: (Think Pair Share)	Date :30-11-2021	No. of students attended : 64

Objective of the activity:

To make students able to understand the concept of stability using RH Criterion, Root Locus
To obtain the value of K from the Root Locus Graph and RH criterion.

Execution Plan:

Time management: Class time: 50min

Before conducting the activity conduct a surprise test, where students have to solve one question individually. Make a note of the marks - 10 mins.

Class of sixty students is best suited for the activity. 15 batches are formed with 4 students each. It is suggested to have one good student in each batch with average and dull students based on the marks scored in the surprised test. Prepare minimum 4 different set of concept oriented analytical questions. – 20mins

One student (the problem solver) is required to read the problem and think aloud during the problem solving process. The batch students (the listeners) attends to the problem solver's thinking and reminds him/her to keep saying aloud what he/she is thinking or doing, while also asking for clarifications and pointing out errors being made (if any).-10min

For the next question the roles should be interchanged and the activity be performed. The questions can be rotated among the students. Altogether each student needs to solve two questions. -10min

Expected Outcomes:

Students to have actively engaged in the learning process on stability concept.
Students to learn and obtain the value of K from the Root Locus Graph and RH Criterion

Assessment:

Total number of students attended = 64
Total percentage of improvement = 96%
No change of students before and after activity = 1%
Negative change of students =NIL

Question paper

- Discuss the effect of adding poles and zeros to forward path transfer function on the root locus of closed loop system?
- The characteristic equation of a feedback control system is $s^4+3s^3+12s^2+(k-16)s+k=0$ Sketch the root locus plot for $0\leq k\leq\infty$ and show that system is conditionally stable ?
- Sketch the root locus of the systems whose open loop transfer function is defined below and Comment on stability. Find the value of 'k' so that the damping ratio of closed loop system is 0.5.

	▪ i) $\frac{K}{S(S+2)(S^2+2S+2)}$ ▪ ii) $\frac{K}{S(S+2)(S^2+2S+17)}$ • Comment on the stability of the system with characteristic equations. ▪ $s^4+8s^3+18s^2+16s+5=0$ ▪ $s^5+s^4+2s^3+2s^2+3s+5=0$ ▪ $s^6+2s^5+8s^4+12s^3+20s^2+16s+16=0$ • For a unity feedback system having forward path transfer function $G(s)=\frac{K}{s(1+0.6s)(1+0.4s)}$ • Determine the range of values of K, marginal values of K and the frequency of sustained oscillations.
Activity photos	

2019-20

List of Faculty Members conducted Activity based teaching

S.No	Name of faculty	Subject name	Name of teaching learning method	Topics covered	
1.	Dr. K sri ram teja	Principles of radar engineering	Concept mapping	Concept mapping is a great way to build upon previous knowledge by connecting new information back to it. It is a diagram that depicts suggested relationships between concepts.	https://drive.google.com/drive/folders/1F1H2m_7_ZSAspGBn4_OsN4b7pkQDwzld
2.	Dr. T V Sainadh Guptha	Computer networks	Interactive quize compititions using mentimeter	Programming concepts of 8051 using Assembly Language Programming and C Programming for parallel ports, Interrupts, Serial communication etc.	https://drive.google.com/drive/folders/1M38BwIwndj5Trk2I9kAGO_q480843b-V
3.	Dr. P.S.Suha sini	Data Compression - Problem on LBG Algorithm	Google Forms	After explaining the LBG algorithm, a problem is given and the students are asked to submit the solution, the same day through Google form.	https://docs.google.com/forms/d/1RUqX6fbqbeRRHWZqDgxTWaYDYHklh7BVyyPaOEcQfhM/edit
4.	Dr. M Padmaja	Microcontrollers	Interactive quize compititions using online google forms	ARM Cortex M3 Memory mapping concepts	https://drive.google.com/drive/u/1/folders/1iF7YOXan6ctQ6QkT2ha2rLWou6KlrStM
5.		17EC 4801/C Cryptography and Data Security	z Competition using Google Class rooms	A quiz program is conducted in May 2020 for IV B. Tech section B & C 50 students participated.	https://forms.gle/EBqSNMLTDahviswXA

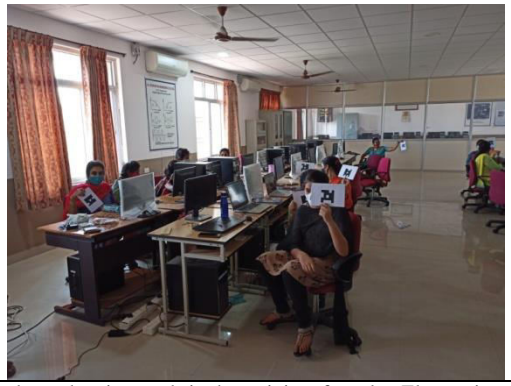
	A Ravi Raja				
			Theoretical classes through online platform	Theoretical concepts are taught through video interaction with students	https://drive.google.com/file/d/1ju3jP8wt2T6Gi0QCzH-N0TKhTIxIUvtM/view?usp=sharing
6.	Dr Shaik Fayaz Ahamed	Microcontroller (8051) programming	Quiz Competition using Google Class rooms	A quiz program is conducted on 30th May 2020 for III B. Tech section B. 60 students participated.	Blank Quiz - Google Forms
			Programming concepts through demo programs	8051 programming concepts are taught through simulation programs.	https://drive.google.com/file/d/1k1-WXUZxnXDs2pljDrvjaZQO46oKy5OS/view?usp=sharing https://drive.google.com/file/d/111EnTHLy6uT2XSKmS9mHwHJFXbQaJ8kD/view?usp=sharing
7.	Dr. Aniruddh Bahadur Yadav	Analog Electronics – Hybrid Model of Transistor	Plickers	Plickers is an assessment tool made by a teacher/instructor who is looking for a quick and simple way to check student understanding. This assessment tool allows teachers/ instructors to collect on-the-spot formative assessment data without the need to have students use devices or paper and pencil. Teachers/instructor can use this tool with previous planning or on the go as needed. This tool provides teachers with the data needed to inform their instruction. It's a data collection tool that's helpful for teachers and fun for the students.	https://drive.google.com/drive/folders/16rWxWtw7FRVP69n8Y_HcWp8b0yUL3uQS

- **Plickers:**

Plickers is an assessment tool made by a teacher/instructor who is looking for a quick and simple way to check student understanding. This assessment tool allows teachers/ instructors to collect on-the-spot formative assessment data without the need to have students use devices or paper and pencil. Teachers/instructor can use this tool with previous planning or on the go as needed. This tool provides teachers with the data needed to inform their instruction. It's a data collection tool that's helpful for teachers and fun for the students.

Type of Learning: Learning takes place through online games and lessons. Students stay engaged throughout the assessment because they find the Assessment activity to be fun.

Usage in ECE for B. Tech and M. Tech Students: It can be used in ECE Department, this assessment tool is used by nearly all the faculty in the department of electronics and communication engineering, VR Siddhartha Engineering college. This tool is used to judge/evaluate the understanding of B. Tech and M. Tech students for electives as well as regular courses. The proof from some classes for this activity is attached here.

	
Students showing cards in the activity of analog Electronics – Hybrid Model of Transistor at DSP Lab	Students showing cards in the activity of analog Electronics – Hybrid Model of Transistor at DSP Lab

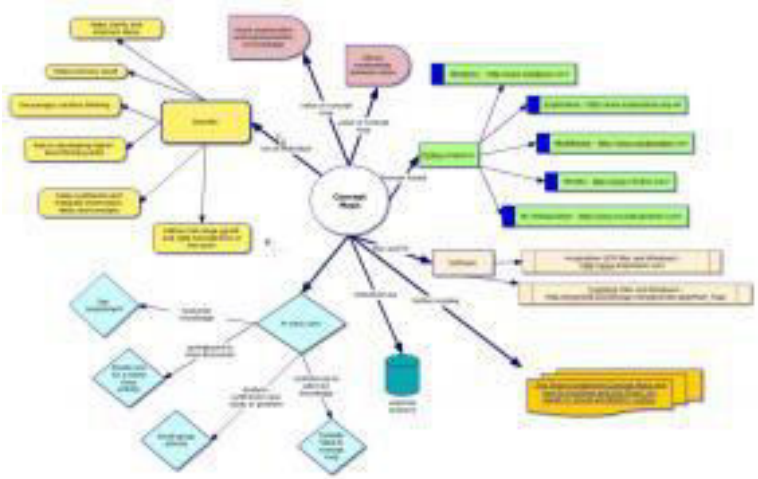
- **Concept mapping**

Concept mapping is a great way to build upon previous knowledge by connecting new information back to it. This post explores the uses of concept mapping and provides tools for creating concept maps on the computer.

If a person knew how to make a lemon meringue pie, it would be easy for him to learn how to make a Baked Alaska. Because of the previous experience making the meringue for the pie, it would be easy to understand how to make a Baked Alaska even though you had never made it before. So it goes with academic learning.

When new knowledge is integrated with and connected to existing knowledge, that new knowledge is easier to understand and to remember. A professor's job is to build scaffolding from existing knowledge on which to hang incoming new knowledge. Using a concept map is one way to build that scaffolding.

A concept map is a visual organization and representation of knowledge. It shows concepts and ideas and the relationships among them. You create a concept map by writing key words (sometimes enclosed in shapes such as circles, boxes, triangles, etc.) and then drawing arrows between the ideas that are related. Then you add a short explanation by the arrow to explain how the concepts are related.



- **Mentimeter**

Mentimeter is a web-based Clicker, Audience Response System (ARS) or Student Response System (SRS) which allows students to answer digital questions using a mobile device. It has the potential to transform the classroom environment into a more interactive, engaging and inclusive one. They can also use other devices such as laptops and tablets with which they can access the website. By the

means of Mentimeter, the teachers can assess the understanding of the students instantly and provide their feedback accordingly. Mentimeter gives every student a voice, and stops only the loudest in the class from being heard. Test your students' knowledge, gather feedback and ask them to reflect with our live polling features. Use word clouds, open-ended questions and more to start conversations and spark ideas in the classroom. Your students can answer using their smartphones.